Example 1

	SI	C1 ABC	C2 ABC	C3 ABC	SO	
PS1		000	000	000		
CP1		010	001	011		
SH1	001001001	001	001	001	010001011	Tests: C1 000-010, C2 000-001, C3 000-011 decode
PS2		001	001	001		
CP2		010	110	010		
SH2	010010010	010	010	010	010110010	Tests: C1 001-010, C2 001-110, C3 001-010 decode
PS3		010	010	010		
CP3		011	011	101		
SH3	011011011	011	011	011	011011101	Tests: C1 010-011, C2 010-011, C3 010-101 decode
PS4		011	011	011		
CP4		110	100	100		
SH4	100100100	100	100	100	110100100	Tests: C1 011-110, C2 011-100, C3 011-100 decode
PS5		100	100	100		
CP5		101	101	101		
SH5	101101101	101	101	101	101101101	Tests: C1 100-101, C2 100-101, C3 100-101 decode
PS6		101	101	111		
CP6		110	110	000		
SH6	110110110	110	110	110	110110000	Tests: C1 101-110, C2 101-110, C3 101-111 decode
PS7		110	110	110		
CP7		011	111	111		
SH7	111111111	111	111	111	011111111	Tests: C1 110-011, C2 110-111, C3 110-111 decode
PS8		111	111	111		
CP8		110	100	000		
SH8	xxxxxxxxx	xxx	xxx	xxx	110100000	Tests: C1 111-110, C2 111-100, C3 111-000 decode

C1 Table

PS ABC	DEF	NS ABC
000	010	010
001	010	010
010	011	011
011	110	110
100	101	101
101	110	110
110	011	011
111	110	110

C2 Table

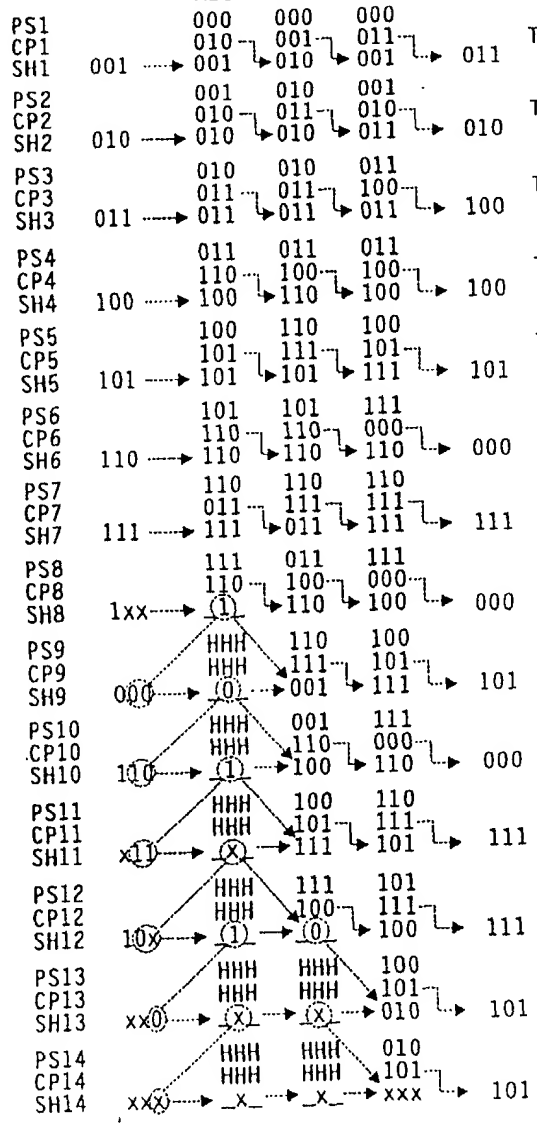
PS ABC	DEF	NS ABC
000	001	001
001	110	110
010	011	011
011	100	100
100	101	101
101	110	110
110	111	111
111	100	100

C3 Table

PS ABC	DEF	NS ABC
000	011	011
001	010	010
010	101	101
011	100	100
100	101	101
101	111	111
110	111	111
111	000	000

Conventional Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 72 = 80

Example 2



Tests: C1 000-010, C2 000-001, C3 000-011 decode

Tests: C1 001-010, C2 010-011, C3 001-010 decode

Tests: C1 010-011, C2 010-011, C3 011-100 decode

Tests: C1 011-110, C2 011-100, C3 011-100 decode

Tests: C1 100-101, C2 110-111, C3 100-101 decode

Tests: C1 101-110, C2 101-110, C3 111-000 decode

Tests: C1 110-011, C2 110-111, C3 110-111 decode

Tests: C1 111-110, C2 011-100, C3 111-000 decode
Loads C1's BM with first bit of C2's 001 Stimulus

Tests: C2 110-111, C3 100-101 decode
Bypass C1 & Hold (H) C1's Scan Path
Load C2's remaining 001 stimulus

Tests: C2's remaining 001-110, C3 111-000 decode
Loads C1's BM with first bit of C2's 111 Stimulus

Tests: C2's remaining 100-011, C3 110-111 decode

Tests: Remaining C2 111-100 & C3 101-111 decode
Loads C1's & C2's BM with first 2 bits of C3's 010 stimulus

Bypass C2 & Hold (H) C2's Scan Path
Load C3's remaining 010 stimulus

Tests: C3's remaining 010-101 decode

C1 Table

PS ABC	DEF	NS ABC
000	010	010
001	010	010
010	011	011
011	110	110
100	101	101
101	110	110
110	011	011
111	110	110

C2 Table

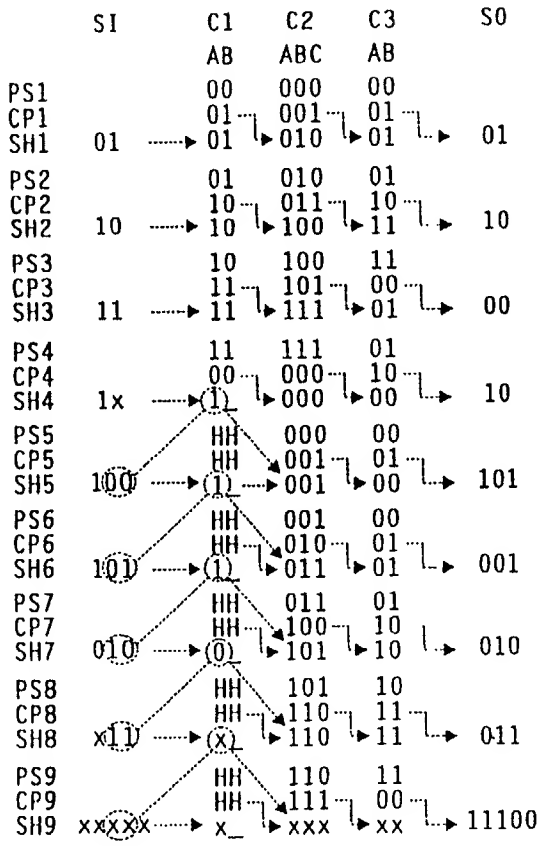
PS ABC	DEF	NS ABC
000	001	001
001	110	110
010	011	011
011	100	100
100	101	101
101	110	110
110	111	111
111	100	100

C3 Table

PS ABC	DEF	NS ABC
000	011	011
001	010	010
010	101	101
011	100	100
100	101	101
101	111	111
110	111	111
111	000	000

Warping Scan Test Clocks = Capture Clocks + Shift Clocks = 14 + 42 = 56
Conventional Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 72 = 80

Example 3



Tests: C1 00-01, C2 000-001, C3 00-01 decode

Tests: C1 01-10, C2 010-011, C3 01-10 decode

Tests: C1 10-11, C2 100-101, C3 11-00 decode

Tests: C1 11-00, C2 111-000, C3 01-10 decode
Loads C1's BM with first bit of C2's 001 Stimulus

Tests: C2 000-001, C3 00-01 decode
Bypass C1 & Hold (H) C1's Scan Path
Load C2's remaining 001 stimulus

Tests: C2 001-010, C3 00-01 decode
Load C2's remaining 011 stimulus

Tests: C2 011-100, C3 01-10 decode
Load C2's remaining 101 stimulus

Tests: C2 101-110, C3 10-11 decode

Tests: C2 110-111, C3 11-00 decode

C1 Table

PS AB	CD	NS AB
00	01	01
01	10	10
10	11	11
11	00	00

C2 Table

PS ABC	DEF	NS ABC
000	001	001
001	010	010
010	011	011
011	100	100
100	101	101
101	110	110
110	111	111
111	000	000

C3 Table

PS AB	CD	NS AB
00	01	01
01	10	10
10	11	11
11	00	00

Warping Scan Test Clocks = Capture Clocks + Shift Clocks = 9 + 25 = 34

Conventional Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 56 = 64

Example 4

	SI	C1 ABC	C2 AB	C3 AB	SO	
PS1		000	00	00		
CP1		001	01	01		
SH1	001	001	00	10	101	Tests: C1 000-001, C2 00-01, C3 00-01 decode
PS2		001	00	10		
CP2		010	01	11		
SH2	010	010	01	00	111	Tests: C1 001-010, C2 00-01, C3 10-11 decode
PS3		010	01	00		
CP3		011	10	01		
SH3	011	011	01	11	001	Tests: C1 010-011, C2 01-10, C3 00-01 decode
PS4		011	01	11		
CP4		100	10	00		
SH4	100	100	10	01	000	Tests: C1 011-100, C2 01-10, C3 11-00 decode
PS5		100	10	01		
CP5		101	11	10		
SH5	101	101	10	11	110	Tests: C1 100-101, C2 10-11, C3 01-10 decode
PS6		101	10	11		
CP6		110	11	00		
SH6	110	110	11	01	100	Tests: C1 101-110, C2 10-11, C3 11-00 decode
PS7		110	11	01		
CP7		111	00	10		
SH7	111	111	11	10	010	Tests: C1 110-111, C2 11-00, C3 01-10 decode
PS8		111	11	10		
CP8		000	00	11		
SH8	xxxxxxx	xxx	xx	xx	0000011	Tests: C1 111-000, C2 11-00, C3 10-11 decode

C1 Table

PS ABC	DEF	NS ABC
000	001	001
001	010	010
010	011	011
011	100	100
100	101	101
101	110	110
110	111	111
111	000	000

C2 Table

PS AB	CD	NS AB
00	01	01
01	10	10
10	11	11
11	00	00

C3 Table

PS AB	CD	NS AB
00	01	01
01	10	10
10	11	11
11	00	00

Warping Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 28 = 36

Conventional Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 56 = 64

Example 5

	SI	C1 ABC	C2 ABC	SO	
PS1		000	000		
CP1		001	010		
SH1	001	001	001	010	Tests: C1 000-001, C2 000-010 decode
PS2		001	001		
CP2		010	011		
SH2	010	010	010	011	Tests: C1 001-010, C2 001-011 decode
PS3		010	010		
CP3		011	100		
SH3	011	011	011	100	Tests: C1 010-011, C2 010-100 decode
PS4		011	011		
CP4		100	101		
SH4	100	100	100	101	Tests: C1 011-100, C2 011-101 decode
PS5		100	100		
CP5		101	110		
SH5	101	101	101	110	Tests: C1 100-101, C2 100-110 decode
PS6		101	101		
CP6		110	111		
SH6	110	110	110	111	Tests: C1 101-110, C2 101-111 decode
PS7		110	110		
CP7		111	000		
SH7	111	111	111	000	Tests: C1 110-111, C2 110-000 decode
PS8		111	111		
CP8		000	001		
SH8	xxxxxx	xxx	000	000001	Tests: C1 111-000, C2 111-001 decode

C1 Table

PS ABC	DEF	NS ABC
000	001	001
001	010	010
010	011	011
011	100	100
100	101	101
101	110	110
110	111	111
111	000	000

C2 Table

PS ABC	DEF	NS ABC
000	010	010
001	010	011
010	100	100
011	100	101
100	110	110
101	110	111
110	000	000
111	000	001

Warping Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 27 = 35

Conventional Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 48 = 56

Example 6

	SI	C1 ABC	C2 ABC	SO	
PS1		000	000		
CP1		001	010		
SH1	001	001	001	010	Tests: C1 000-001, C2 000-010 decode
PS2		001	001		
CP2		010	101		
SH2	010	010	010	101	Tests: C1 001-010, C2 001-101 decode
PS3		010	010		
CP3		011	110		
SH3	011	011	011	110	Tests: C1 010-011, C2 010-110 decode
PS4		011	011		
CP4		100	001		
SH4	100	100	100	001	Tests: C1 011-100, C2 011-001 decode
PS5		100	100		
CP5		101	010		
SH5	101	101	101	010	Tests: C1 100-101, C2 100-010 decode
PS6		101	101		
CP6		110	101		
SH6	110	110	110	101	Tests: C1 101-110, C2 101-101 decode
PS7		110	110		
CP7		111	110		
SH7	111	111	111	110	Tests: C1 110-111, C2 110-110 decode
PS8		111	111		
CP8		000	001		
SH8	xxxxxx	xxx	000	000001	Tests: C1 111-000, C2 111-001 decode

C1 Table

PS ABC	DEF	NS ABC
000	001	001
001	010	010
010	011	011
011	100	100
100	101	101
101	110	110
110	111	111
111	000	000

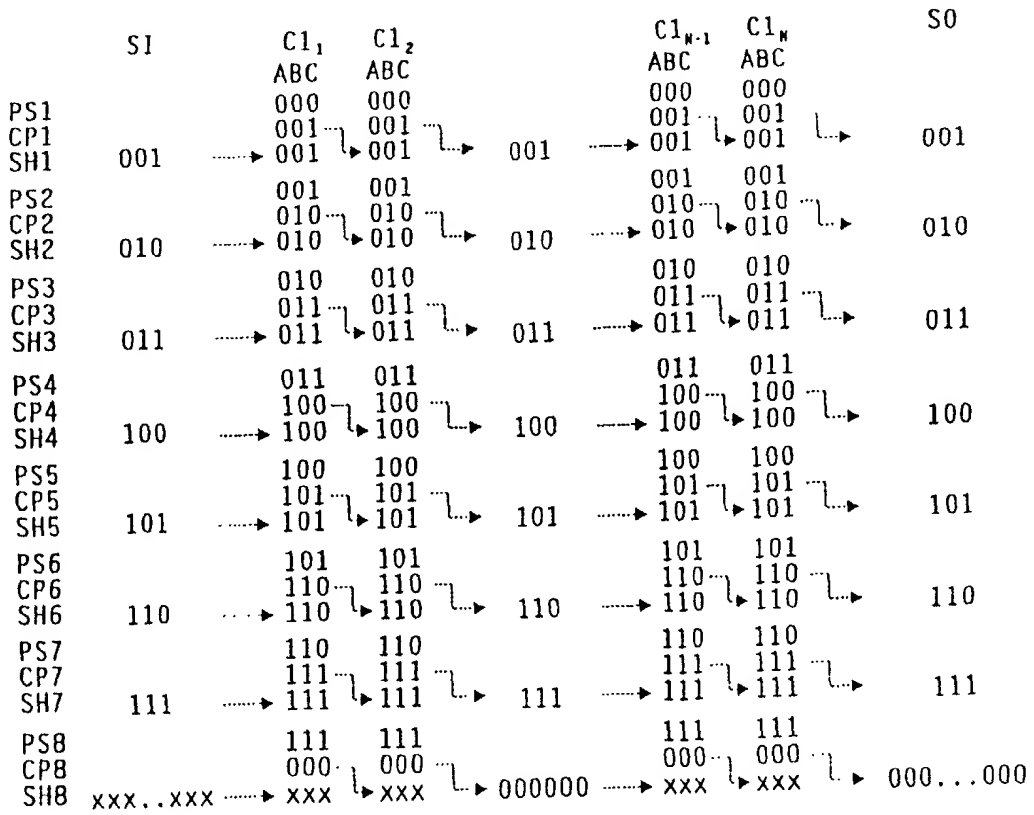
C2 Table

PS ABC	DE	NS ABC
000	01	010
001	10	101
010	11	110
011	00	001
100	01	010
101	10	101
110	11	110
111	00	001

Warping Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 27 = 35

Conventional Scan Test Clocks = Capture Clocks + Shift Clocks = 8 + 48 = 56

Example 7



C1 Table

PS ABC	DEF	NS ABC
000	001	001
001	010	010
010	011	011
011	100	100
100	101	101
101	110	110
110	111	111
111	000	000

P = Circuit's test pattern count
L = Circuit's scan path length
C = Capture clock per test pattern
N = Number of circuits

Warping Scan Test Clocks = P(C+L) + NL-L
Conventional Scan Test Clocks = P(C+NL)

For large L & P

Warping Scan Test Clocks = L(P+(N-1))
Conventional Scan Test Clocks = LPN

For L=2000, P=1000, N=1

Warping Scan Test Clocks = 2,000,000
Conventional Scan Test Clocks = 200,000,000

For L=2000, P=1000, N=100

Warping Scan Test Clocks = 2,198,000
Conventional Scan Test Clocks = 200,000,000

For L=2000, P=1000, N=1000

Warping Scan Test Clocks = 3,998,000
Conventional Scan Test Clocks = 2,000,000,000